

# PATENT ABSTRACTS OF JAPAN

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(21)Application number : 2001-364345 (71)Applicant : AJINOMOTO CO INC

(22)Date of filing : 29.11.2001 (72)Inventor : NAKADA YUJI

NAKASUJI MIKIO

MIYAKE HIROKO

TAJIMA IKUICHI

MATSUZAKI SEISHU

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## (54) OIL AND FAT COMPOSITION

### (57)Abstract:

PROBLEM TO BE SOLVED: To provide an oil and fat composition hardly causing irritating unpleasant odor when heated, and effective for keeping health.

SOLUTION: This oil and fat composition is constituted of the whole fatty acid composition regulated so that proportions of oleic acid, linoleic acid and linolenic acid are 42-65 wt.%, 24-44 wt.% and 1.0-4.0 wt.%, respectively.

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## CLAIMS

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[Claim(s)]

[Claim 1] An oil and fat composition whose rate of oleic acid contained in a total-fatty-acid presentation which constitutes an oil and fat composition is a range whose rate of 24 to 44 % of the weight and linolenic acid a rate of 42 to 65 % of the weight and linolic acid is 1.0 to 4.0 % of the weight [Claim 2] 42 to 65% of the weight, a rate of oleic acid contained in a total-fatty-acid presentation so that a rate of linolic acid may become a range whose rate of 24 to 44 % of the weight and linolenic acid is 1.0 to 4.0 % of the weight, (A) An oil and fat composition which a rate of linolenic acid contained in a total-fatty-acid presentation mixed fats and oils which consist of one or more kinds in 35 to 95 % of the weight, (B) corn oil, rice bran oil, high linolic acid kind safflower oil, and high linolic acid kind sunflower seed oil oleum rapae which is 6.0 or less % of the weight by 5 to 65% of the weight of a ratio, and was prepared [Claim 3] The oil and fat composition according to any one of claims 1 to 2 ranges of whose ratio of the oleic acid/linolic acid contained in a total-fatty-acid presentation which constitutes an oil and fat composition are 1.0-2.7 [Claim 4] Edible oil and fat which consists of the oil and fat composition according to any one of claims 1 to 3

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[Translation done.]

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## DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention has few pungent smells of the edible-oil-and-fat

origin produced during fly cooking work, and unpleasant smells, and it is related with the good oil and fat composition of balance maintaining health.

[0002]

[Description of the Prior Art]Fats and oils are an important energy source for a person and other mammals, and it is a supply source of essential fatty acid indispensable to a living body, and it is important to see from a point of nutrition and to take in each fatty acid of saturated fatty acid, monounsaturated fatty acid, and polyunsaturated fatty acid with sufficient balance.

[0003]By the way, if soybean oil and oleum rapae are heated and fly is performed in eating-and-drinking service stores, such as an ordinary home, a daily dish store, a restaurant, and a prepared food plant, will produce the characteristic fragrant smell which invites appetite, but. The smell [ like ] which stimulates eyes and a throat according to the state of the fats and oils to be used, and an unpleasant smell which gets bad [ a temper ] may also be produced. It is a key factor that various secondary products generate this by the oxidation reaction by heating, and volatilization diffusion is carried out into the air. Therefore, it may be connected also with the offensive odor complaint from residents, when fly cooking was performed for a long time and the work environment of a kitchen not only worsening for a smell but a cooking exhaust gas is discharged by the outdoors for a long period of time.

[0004]If fats and oils and air contact at an elevated temperature, intense oxidation reaction occurs, the fatty-acid-degradation thing in fats and oils volatilizes, and producing a pungent smell and an unpleasant smell is known. Oxidation and decomposition of fatty acid change with constituent fatty acids, and the oxidation rate of oleic acid which is main fatty acid of vegetable oil, linolic acid, and linolenic acid is early in order of linolenic acid with a high degree of unsaturation, linolic acid, and oleic acid. In order to improve oxidation stability, even if the oil seed to which the linolenic acid content was reduced by mating, mutation, gene recombination, etc. is developed, oxidation stability of fats and oils obtained from this seed is improving and it heats, it is checked that a pungent smell and an unpleasant smell decrease from the conventional variety. However, linolenic acid is essential fatty acid which must be taken in from foodstuffs for health maintenance, and when there is too little intake, it may cause an essential-fatty-acid deficiency disease.

[0005]Various methods are tried in order to improve the pungent smell and unpleasant smell at the time of heating. For example, there is a method of having the improved oxidation stability and providing oleum rapae with few heated odors

(JP,2000-262214,A). The total-fatty-acid presentation of oleum rapae contains

linolenic acid 0.5 to 5% of the weight, and this method contains oleic acid 70 to 85% of the weight.

[0006]It has the feature that this method reduces the amount of linolenic acid, and contains many amounts of oleic acid with 70 to 85 % of the weight. If "oleic acid content becomes smaller than 70 % of the weight at this the 3rd page of publication before examination [0014], this, If the fall tendency of the stability of the fats and oils at the time of heating becomes remarkable and a linolenic acid content becomes larger than 5 % of the weight, it will be because generating of a heated odor becomes strong. As indicated as ", It is because it is in the tendency which a heated odor does not generate, so that there are so few the increase of stability and the linolenic acid contents of fats and oils at the time of heating that there are generally many oleic acid contents. However, as compared with the fats and oils obtained from the conventional low linolenic acid rapeseed seed, the reduction effect of the pungent smell at the time of heating or an unpleasant smell was not enough.

[0007]After adding hydrogenated fats and oils to liquid oil and/or solid fat, the method of controlling the reversion flavour which is made to reduce the unpleasant smell generated at the time of heating, and is generated at the time of preservation is also provided by distributing a lipolytic enzyme and making it contact (JP,2000-50893,A).

[0008]However, since it becomes indispensable requirements using hydrogenated fats and oils to make a lipolytic enzyme act on this, cost becomes high rather than natural oil fat, and this method has the fault of not meeting a natural intention.

[0009]

[Problem(s) to be Solved by the Invention]A pungent smell and an unpleasant smell when it heats can reduce this invention as compared with the conventional fats and oils, and an object of this invention is to provide maintaining health with the good oil and fat composition of balance.

[0010]

[Means for Solving the Problem]A result studied about a method of decreasing a pungent smell and an unpleasant smell when this invention person heats edible oil and fat, Linolenic acid which is constituent fatty acids especially with main edible oil and fat in which the constituent-fatty-acids presentation optimal in edible oil and fat is, In relation between a pungent smell when it heats with a content of linolic acid and each oleic acid, or an unpleasant smell. Linolic acid which is made low [ oxidation stability ] few as for a pungent smell and an unpleasant smell when the lower one heats a linolenic acid content with low oxidation stability found out that a pungent smell and an unpleasant smell when the one where a content is unexpectedly lower heats

became strong. A tendency whose pungent smell or unpleasant smell even if a content became high oleic acid with the highest oxidation stability, when it heats decrease was not shown.

[0011]Although the lower one of a linolenic acid content was preferred, it turned out that a balance ratio with optimal linolic acid content and oleic acid content exists. According to this invention, when a rate of linolic acid prepares 24 to 44% of the weight 42 to 65% of the weight in a range whose rate of linolenic acid is 1.0 to 4.0 % of the weight, a rate of oleic acid contained in a total-fatty-acid presentation which constitutes an oil and fat composition, An oil and fat composition which can control a pungent smell and an unpleasant smell when a ratio of the oleic acid/linolic acid contained in a total-fatty-acid presentation which constitutes an oil and fat composition still more preferably prepares in the range of 1.0-2.7 and it heats can be obtained.

[0012]A rate of oleic acid contained in a total-fatty-acid presentation which constitutes an oil and fat composition an invention concerning claim 1 42 to 65 % of the weight, A rate of linolic acid is an oil and fat composition which is a range whose rate of 24 to 44 % of the weight and linolenic acid is 1.0 to 4.0 % of the weight, and an invention concerning claim 2, 42 to 65% of the weight, a rate of oleic acid contained in a total-fatty-acid presentation so that a rate of linolic acid may become a range whose rate of 24 to 44 % of the weight and linolenic acid is 1.0 to 4.0 % of the weight, A rate of linolenic acid contained in a total-fatty-acid presentation oleum rapae which is 6.0 or less % of the weight (A) 35 to 95 % of the weight, and (B) corn oil, It is the oil and fat composition which mixed fats and oils which consist of one or more kinds in rice bran oil, high linolic acid kind safflower oil, and high linolic acid kind sunflower seed oil by 5 to 65% of the weight of a ratio, and was prepared, An invention concerning claim 3 is the oil and fat composition according to any one of claims 1 to 2 ranges of whose ratio of the oleic acid/linolic acid contained in a total-fatty-acid presentation which constitutes an oil and fat composition are 1.0-2.7, An invention concerning claim 4 is edible oil and fat which consists of the oil and fat composition according to any one of claims 1 to 3.

[0013]

[Embodiment of the Invention]Hereafter, this invention is explained in detail. As vegetable fat and oil used for the oil and fat composition of this invention, Usually, it may be edible oil and fat and its improvement-of-a-species fats and oils, such as soybean oil, oleum rapae, corn oil, cottonseed cake oil, safflower oil, sesame oil, sunflower seed oil, rice bran oil, earth nut oil, olive oil, coconut oil, palm oil, and palm

kernel oil, and an item or two or more kinds of combination articles may be sufficient. Corn oil, safflower oil, sunflower seed oil, rice bran oil, and especially low linolenic acid kind oleum rapae are preferred from a functional point.

[0014]Although any of liquid oil and solid fat may be sufficient as the oil and fat composition of this invention, from a point of cooking fitness, it is preferred that it is liquid oil.

[0015]Although limitation in particular does not have the origin of the oil and fat composition of this invention and an ester interchange and hydrogenation may be started, when hydrogenation is performed, there is a report of the serum cholesterol concentration rise by saturated fatty acid or transformer acid, etc., and natural oil fat is usually used also in terms of a cost hike.

[0016]If soybean oil and 10.0% of the weight of the oleum rapae whose amount of linolenic acid is 7.0 % of the weight are heated, a pungent smell and an unpleasant smell will be revealed, but if the fats and oils obtained from the rapeseed which reduced the amount of linolenic acid to 1.0 to 4.0 % of the weight by improvement of a species are heated, the manifestation of a pungent smell and an unpleasant smell will be reduced. In order to reduce the pungent smell at the time of heating, and an unpleasant smell, the method of reducing the amount of linolenic acid is effective, but it is important to also control the rate of oleic acid/linolic acid in addition to it.

[0017]That is, when the amount of linolenic acid is carried out to 1.0 to 4.0% of the weight and the rate of the amount of oleic acid prepares 42 to 65% of the weight in the range whose rate of the amount of linolic acid is 24 to 44 % of the weight, The oil and fat composition which can control a pungent smell and an unpleasant smell when it heats by preparing the wt. ratio of oleic acid/linolic acid in the range of 1.0–2.7 still more preferably can be obtained.

[0018]Although there is no limitation in the manufacturing method of an oil and fat composition in that case, if the rate of the linolenic acid contained in a total-fatty-acid presentation uses the low linolenic acid kind oleum rapae which is 6.0% or less, The low linolenic acid kind oleum rapae whose percentage of (A) linolenic acid there are few pungent smells at the time of heating and unpleasant smells, and is 6.0% or less further 35 – 95 % of the weight and (B) corn oil, If the edible oil and fat prepared so that the fats and oils which consist of one or more kinds in rice bran oil, high linolic acid kind safflower oil, and high linolic acid kind sunflower seed oil might be mixed by 5 to 65% of the weight of a ratio and it might become a mentioned range about each quantity of linolenic acid, oleic acid, and linolic acid is used, the pungent smell at the time of heating and an unpleasant smell will decrease.

[0019]Iodine value has [ high linolic acid kind sunflower seed oil / the thing of 120-142 ] iodine value preferred [ if high linolic acid kind safflower oil is general here, there will be no limitation in particular, but ] to the thing of 140-150, and the appearance.

[0020]From points, such as improvement in oxidation stability of fats and oils, heating stability improvement, and functional grant, to tocopherol. Defoaming agents, such as emulsifiers, such as metal chelators, such as antioxidants; such as ascorbyl palmitate, a rosemary extract, a tea extract, and a glycyrrhiza extract, citrate, and malic acid, a glycerine fatty acid ester, sucrose fatty acid ester, and lecithin, and silicone, can also be added arbitrarily suitably.

[0021]the use of the oil and fat composition of this invention -- the object for flies -- although it stir-fries and can be used for all for business and eating raw food, in especially fly cooking, the effect is remarkable. The effect is demonstrated also in prepared food plants, such as the food service industry of home meal replacement industries, such as cooking in an ordinary home, and a lunch daily dish store, a tempura store, a pork cutlet store, etc., and prepared frozen food. The effect is demonstrated also when reheating frozen foods, a fats-and-oils content seasoning, etc. at the time of eating.

[0022]

[Example]Hereafter, an example explains this invention concretely. This invention is not limited to these examples.

[0023]With a heating machine with a temperature controller (physicochemistry industrial company make, "LABOX-115"), to 180 \*\*, example 1 smell evaluation takes fats and oils to a 600g magnetism pan, heats them, and as whole intensity and concrete smell characteristic, that a pungent smell (it was considered as Tun smell), a sour odor (it deteriorated smell), grassy smell, and like metal -- hey -- that of the fish -- hey, desirable -- it is sweet -- it evaluated in six steps by seven panels which stacked training about six items of a smell, and the average mark was computed. Mark were taken as the following definitions.

zero : one no odor: -- it can perceive at last -- smell 2 point: -- it is weak -- smell 3 point: -- it can perceive comfortably -- smell 4 point: -- it is strong -- smell 5 point: -- an intense smell [0024]The following constituent was used as a sample.

Comparison Article 1:regular canola oil (Regular Canola oil it is hereafter written as "R. C.")

Usually, 9.9% of 22.2% of 58.6% of fats-and-oils oleic acid linolic acid linolenic acid to which it is the thing refined by pressing oil a Canadian rapeseed, and fatty acid

composition corresponds below [0025]Comparative example 2: Low linolenic acid kind canola oil (Low Linolenic Canolaoil it is hereafter written as "L. L.C.")

3.2% of 22.4% of 66.2% of fats-and-oils oleic acid linolic acid linolenic acid to which it is the thing refined by pressing oil a low linolenic acid kind Canadian rapeseed, and fatty acid composition corresponds below [0026]Comparative example 3: quantity oleic acid low linolenic acid kind canola oil (High Oleic LowLinolenic Canola oil it is hereafter written as "H. O.L.L.C.")

1.9% of 13.7% of 76.4% of fats-and-oils oleic acid linolic acid linolenic acid to which it is the thing refined by pressing oil a high oleic acid low linolenic acid kind Canadian rapeseed, and fatty acid composition corresponds below [0027]This invention article 1: With the fats and oils which mixed 30 copies of corn refined oil, fatty acid composition corresponds to 70 copies of low linolenic acid kind canola refined oil below.

2.3% of 33.1% of 55.0% of oleic acid linolic acid linolenic acid [0028]This invention article 2: With the fats and oils which mixed 50 copies of corn refined oil, fatty acid composition corresponds to 50 copies of low linolenic acid kind canola refined oil below.

The fatty acid composition of 39.6% of 47.9% of oleic acid linolic acid linolenic acid 2.0% various kinds and the obtained evaluation result were as follows.

[0029]

[Table 1]

脂肪酸組成

脂肪酸組成 (重量%)	比較例1: R. C.	比較例2: L.L.C.	比較例3: H.O.L.L.C.	本発明品1	本発明品2
オレイン酸	58. 6	66. 2	76. 4	55. 0	47. 9
リノール酸	22. 2	22. 4	13. 7	33. 1	39. 6
リノレン酸	9. 9	3. 2	1. 9	2. 3	2. 0
オレイン酸/リノール酸	2. 64	2. 96	5. 58	1. 66	1. 21

[0030]

[Table 2]

官能評価

官能評価(n=7)	比較例1: R.C.	比較例2: L.L.C.	比較例3: H.O.L.L.C.	本発明品1	本発明品2
刺激臭 (ツンとしたにおい)	2. 74	2. 43	2. 47	2. 07	1. 57
酸敗臭 (劣化したにおい)	1. 50	0. 67	0. 67	0. 66	0. 71
青臭さ	1. 00	0. 57	0. 41	0. 00	0. 00
金属様のにおい	0. 14	0. 00	0. 00	0. 00	0. 00
魚様のにおい	0. 71	0. 29	0. 29	0. 00	0. 00
好ましい甘いにおい	0. 26	0. 36	0. 61	1. 14	1. 71
全体のにおい強度	4. 14	3. 29	3. 50	3. 07	2. 64

[0031] From the above-mentioned result, both four articles with a low linolenic acid content became very clear [ that the whole smell intensity is reduced ] at the smell a pungent smell, a sour odor, grassy smell, and like metal, and that of the fish as compared with the comparative example 1. this invention article 1 and this invention article 2 the ranges of whose ratio of oleic acid/linolic acid are 1.0-2.7 had a pungent smell, grassy smell, the fish's smell, and weak smells, such as the whole smell intensity, as compared with both the comparative examples 1, comparative examples 2, and comparative examples 3, and it was shown that a desirable sweet smell increases.

[0032] Example 2 smell evaluation took fats and oils to the 600g magnetism pan, and heated them to 180 \*\* with the heating machine with a temperature controller (physicochemistry industrial company make, "LABOX-115"), and it evaluated by ten panels which stacked training about the strength of a pungent smell or an unpleasant smell. The evaluation result was taken as the following definitions.

O : -- it is weak -- smelling — O: — it can perceive comfortably -- smelling -- \*\*: -- it is strong -- smelling -- x: -- the fatty acid composition of intense smell various samples and the obtained evaluation result were as follows.

[0033]

[Table 3]

	油脂・配合割合 <sup>*1</sup>	C18:1	C18:2	C18:3	C18:1/C18:2	評価
試料1	HLS100	14.0	75.6	0.1	0.2	×
試料2	CN100	30.1	55.7	1.0	0.5	△
試料3	LLC50/HLS50	38.8	50.9	1.7	0.8	○
試料4	LLC35/CN65	42.7	44.0	1.8	1.0	◎
試料5	LLC50/CN60	47.9	39.6	2.0	1.2	◎
試料6	LLC70/HLS30	49.5	39.7	2.3	1.2	◎
試料7	LLC70/HLSu30	52.1	36.2	2.5	1.4	◎
試料8	LLC80/HLS20	54.9	34.1	2.5	1.6	◎
試料9	LLC70/CN30	55.0	33.1	2.3	1.7	◎
試料10	LLC50/RBO50	55.0	29.4	2.0	1.9	◎
試料11	LLC80/CN20	58.5	29.9	2.5	2.0	◎
試料12	LLC90/HLS10	60.3	28.5	2.8	2.1	◎
試料13	LLC90/CN10	62.1	26.6	2.7	2.3	◎
試料14	LLC95/CN5	64.4	24.1	3.1	2.7	◎
試料15	LLC100	66.2	22.4	3.2	3.0	○
試料16	LLC70/HOS30	68.8	20.8	2.3	3.3	△
試料17	LLC50/HOS50	70.9	19.4	1.7	3.7	△
試料18	HOS100	77.3	15.5	0.1	5.0	×

\*1: The passage of the following [ abbreviation / of fats and oils ]. A number expresses a blending ratio.

HLS (High Linoleic Safflower.) oil high linolic acid kind safflower oil CN (Corn.) oil corn oil LLC (Low Linolenic.) Canola oil low linolenic acid kind oleum rapae HLSu (High

Linoleic Sunflower oil) High linolic acid kind sunflower-seed-oil RBO (Rice Bran oil) rice bran oil HOS (High Oleic.) Safflower oil high oleic acid kind safflower oil [0034] By 3.2% or less of experiment system, if the amount of linolenic acid investigates the relation of the strength of the pungent smell at the time of oleic acid / linolic acid ratio, and heating, or an unpleasant smell, Becoming weak in the range of oleic acid / linolic acid ratios 1.0-2.7, and becoming stronger, as it separates from the range higher than this ratio and the low range was shown, and it became clear that there is the optimal ratio for oleic acid / linolic acid ratio.

[0035]

[Effect of the Invention] According to this invention, the rate of the linolenic acid contained in the total-fatty-acid presentation which constitutes an oil and fat composition 1.0 to 4.0 % of the weight, The oil and fat composition which has a rate of oleic acid in the range whose rate of linolic acid is 24 to 44 % of the weight 42 to 65% of the weight has balance good for maintaining health, when it carries out fry cooking, reduces the pungent smell of fats-and-oils origin, and an unpleasant smell, and contributes them to the environment of a kitchen, and a cooking exhaust gas improvement.

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(71)出願人 000000066

味の素株式会社

東京都中央区京橋1丁目15番1号

(72)発明者 中田 勇二

神奈川県横浜市鶴見区大黒町7番41号 味  
の素製油株式会社内

(72)発明者 中筋 幹男

神奈川県横浜市鶴見区大黒町7番41号 味  
の素製油株式会社内

(74)代理人 100085109

弁理士 田中 政浩

最終頁に続く

(54)【発明の名称】 油脂組成物

(57)【要約】

【課題】 加熱したときの刺激臭や不快臭が少な  
く、健康を維持するのにバランスのよい油脂組成物を提  
供する。

【解決手段】 油脂組成物を構成する全脂肪酸組成に含  
まれるオレイン酸の割合が4.2~6.5重量%、リノール  
酸の割合が2.4~4.4重量%、リノレン酸の割合が1.  
0~4.0重量%の範囲である油脂組成物。

## 【特許請求の範囲】

【請求項1】 油脂組成物を構成する全脂肪酸組成に含まれるオレイン酸の割合が42～65重量%、リノール酸の割合が24～44重量%、リノレン酸の割合が1.0～4.0重量%の範囲である油脂組成物

【請求項2】 全脂肪酸組成に含まれるオレイン酸の割合が42～65重量%、リノール酸の割合が24～44重量%、リノレン酸の割合が1.0～4.0重量%の範囲になるように、(A)全脂肪酸組成に含まれるリノレン酸の割合が6.0重量%以下である菜種油を35～95重量%と(B)コーン油、米油、高リノール酸種紅花油及び高リノール酸種ひまわり油のうちの1種類以上からなる油脂を5～65重量%の比率で混合して調製された油脂組成物

【請求項3】 油脂組成物を構成する全脂肪酸組成に含まれるオレイン酸/リノール酸の比率が1.0～2.7の範囲である請求項1ないし2のいずれかに記載の油脂組成物

【請求項4】 請求項1ないし3のいずれかに記載の油脂組成物からなる食用油脂

## 【発明の詳細な説明】

## 【0001】

【発明の属する技術分野】本発明は、フライ調理作業中に生ずる食用油脂由来の刺激臭、不快臭が少なく、かつ健康を維持するのにバランスのよい油脂組成物に関するものである。

## 【0002】

【従来の技術】人および他の哺乳動物にとって油脂は重要なエネルギー源であると共に、生体に不可欠な必須脂肪酸の供給源であり、栄養学の点から見て、飽和脂肪酸、一価不飽和脂肪酸、多価不飽和脂肪酸の各脂肪酸をバランスよく摂取することが大事である。

【0003】ところで一般家庭や、惣菜店、レストラン等の飲食サービス店、調理食品製造工場において、大豆油や菜種油を加熱してフライを行うと、食欲を誘う特有の香ばしいにおいを生ずるが、使用する油脂の状態により目や喉を刺激するようなにおいや、気分の悪くなるような不快なにおいも生ずることがある。これは加熱による酸化反応により様々な二次生成物が生成し空気中に揮発拡散されるのが主要原因である。そのため、長時間フライ調理を行うとおのののために調理場の作業環境が悪くなるばかりか、調理排気が長期間屋外に排出された場合、住民からの悪臭苦情にも繋がり兼ねない。

【0004】油脂と空気が高温で接触すると、激しい酸化反応が起こり、油脂中の脂肪酸分解物が揮発し、刺激臭や不快臭を生ずることが知られている。脂肪酸の酸化及び分解は構成脂肪酸により異なり、植物油の主要脂肪酸であるオレイン酸、リノール酸、リノレン酸の酸化速度は、不飽和度の高いリノレン酸、リノール酸、オレイン酸の順に早い。酸化安定性を高めるために交配、突然

変異、遺伝子組替等によりリノレン酸含量を低下させた油種種子が開発され、この種子から得られた油脂は酸化安定性が向上しており、加熱しても刺激臭や不快臭が従来品種より低減することが確認されている。ただし、リノレン酸は健康維持のために食品から摂取しなければならない必須脂肪酸であり、摂取量が少なすぎる場合、必須脂肪酸欠乏症を引き起こす可能性がある。

【0005】更に、加熱時の刺激臭や不快臭を改善するために、様々な方法が試みられている。例えば、改善された酸化安定性を備え、かつ加熱臭の少ない菜種油を提供する方法がある(特開2000-262214号公報)。この方法は菜種油の全脂肪酸組成がリノレン酸を0.5～5重量%含み、オレイン酸を70～85重量%含むものである。

【0006】この方法はリノレン酸量を低減させて、かつオレイン酸量を70～85重量%と多く含むことに特徴がある。これは、該公開公報第3頁【0014】に、「オレイン酸含量が70重量%より小さくなると、加熱時の油脂の安定性の低下傾向が顕著になり、また、リノレン酸含量が5重量%より大きくなると、加熱臭の発生が強くなることによる。」と記載されているように、一般にオレイン酸含量が多いほど加熱時の油脂の安定性が増し、また、リノレン酸含量が少ないほど、加熱臭が発生しない傾向にあるためである。しかし、従来の低リノレン酸菜種種子から得られた油脂と比較して、加熱時の刺激臭や不快臭の減少効果は十分なものではなかった。

【0007】また、液体油および/または固体脂に水素添加油脂を加えた後、脂質分解酵素を分散させ、接触させることにより、加熱時に発生する不快な臭いを低減させ、かつ保存時に生成する戻り臭を抑制する方法も提供されている(特開2000-50893号公報)。

【0008】しかしながら、この方法は水素添加油脂を用い、これに脂質分解酵素を作用させることが必須要件となるので天然油脂よりもコストが高くなり、また天然志向に沿わないという欠点がある。

## 【0009】

【発明が解決しようとする課題】本発明は、加熱したときの刺激臭や不快臭が、従来の油脂と比較して低減でき、健康を維持するのにバランスのよい油脂組成物を提供することを目的とする。

## 【0010】

【課題を解決するための手段】本発明者は、食用油脂を加熱したときの刺激臭や不快臭を減少させる方法について研究した結果、食用油脂中に最適な構成脂肪酸組成があり、特に食用油脂の主要な構成脂肪酸であるリノレン酸、リノール酸、オレイン酸等の含量と加熱したときの刺激臭や不快臭との関係では、酸化安定性が低いリノレン酸含量は低い方が加熱したときの刺激臭や不快臭は少なく、また、酸化安定性が低いとされるリノール酸は意外にも含量の低い方が加熱したときの刺激臭や不快臭

が強くなることを見出した。最も酸化安定性の高いオレイン酸は含量が高くなつても加熱したときの刺激臭や不快臭が少なくなる傾向は示さなかつた。

【0011】リノレン酸含量は低い方が好ましいが、リノール酸含量及びオレイン酸含量は最適なバランス比が存在することが分かつた。本発明によれば、油脂組成物を構成する全脂肪酸組成に含まれるオレイン酸の割合が4.2～6.5重量%、リノール酸の割合が2.4～4.4重量%、リノレン酸の割合が1.0～4.0重量%の範囲に調製することにより、さらに好ましくは油脂組成物を構成する全脂肪酸組成に含まれるオレイン酸/リノール酸の比率が1.0～2.7の範囲に調製することにより加熱したときの刺激臭や不快臭が抑制できる油脂組成物を得ることができる。

【0012】請求項1に係る発明は、油脂組成物を構成する全脂肪酸組成に含まれるオレイン酸の割合が4.2～6.5重量%、リノール酸の割合が2.4～4.4重量%、リノレン酸の割合が1.0～4.0重量%の範囲である油脂組成物であり、請求項2に係る発明は、全脂肪酸組成に含まれるオレイン酸の割合が4.2～6.5重量%、リノール酸の割合が2.4～4.4重量%、リノレン酸の割合が1.0～4.0重量%の範囲になるように、(A)全脂肪酸組成に含まれるリノレン酸の割合が6.0重量%以下である菜種油を3.5～9.5重量%と(B)コーン油、米油、高リノール酸種紅花油及び高リノール酸種ひまわり油のうちの1種類以上からなる油脂を5～6.5重量%の比率で混合して調製された油脂組成物であり、請求項3に係る発明は、油脂組成物を構成する全脂肪酸組成に含まれるオレイン酸/リノール酸の比率が1.0～2.7の範囲である請求項1ないし2のいずれかに記載の油脂組成物であり、請求項4に係る発明は、請求項1ないし3のいずれかに記載の油脂組成物からなる食用油脂である。

### 【0013】

【発明の実施の形態】以下、本発明について詳細に説明する。本発明の油脂組成物に使用される植物性油脂としては、通常、大豆油、菜種油、コーン油、綿実油、紅花油、ごま油、ひまわり油、米油、落花生油、オリーブ油、やし油、パーム油、パーム核油等の食用油脂及びその品種改良油脂であり、単品もしくは2種類以上の配合品でもよい。官能の点からコーン油、紅花油、ひまわり油、米油、低リノレン酸種菜種油は特に好ましい。

【0014】本発明の油脂組成物は液体油及び固体脂のいずれでもよいが、調理適性の点からは液体油であるのが好ましい。

【0015】本発明の油脂組成物の由来は特に限定はなく、エステル交換や水素添加をおこつても良いが、水素添加を行つた場合には、飽和脂肪酸やトランス酸による血清コレステロール濃度上昇などの報告があり、またコストアップの点からみても天然油脂が通常用いられる。

【0016】リノレン酸量が7.0重量%の大豆油や10.0重量%の菜種油を加熱すると刺激臭や不快臭が発現するが、品種改良によりリノレン酸量を1.0～4.0重量%まで低減させた菜種から得られた油脂を加熱すると刺激臭、不快臭の発現は低減する。更に、加熱時の刺激臭、不快臭を減らすには、リノレン酸量を低減させる方法は有効であるが、それに加えてオレイン酸/リノール酸の割合をも制御することが重要である。

【0017】つまり、リノレン酸量を1.0～4.0重量%にし、かつオレイン酸量の割合が4.2～6.5重量%、リノール酸量の割合が2.4～4.4重量%の範囲に調製することにより、さらに好ましくはオレイン酸/リノール酸の重量比率を1.0～2.7の範囲に調製することにより加熱したときの刺激臭や不快臭が抑制できる油脂組成物を得ができるのである。

【0018】その際、油脂組成物の製造方法に限定はないが、全脂肪酸組成に含まれるリノレン酸の割合が6.0%以下である低リノレン酸種菜種油を用いると、加熱時の刺激臭、不快臭が少なく、更に、(A)リノレン酸の割合が6.0%以下である低リノレン酸種菜種油を3.5～9.5重量%と(B)コーン油、米油、高リノール酸種紅花油及び高リノール酸種ひまわり油のうちの1種類以上からなる油脂を5～6.5重量%の比率で混合してリノレン酸、オレイン酸、リノール酸の夫々の量を上記範囲になるように調製した食用油脂を用いると、加熱時の刺激臭、不快臭が低減する。

【0019】ここで高リノール酸種紅花油は一般のものであれば特に限定はないが、ヨウ素価が140～150のもの、同様に、高リノール酸種ひまわり油は、ヨウ素価が120～142のものが好ましい。

【0020】油脂の酸化安定性向上、加熱安定性向上、機能性付与等の点から、トコフェロール、アスコルビン酸パルミテート、ローズマリー抽出物、茶抽出物、甘草抽出物等の酸化防止剤や、クエン酸やリンゴ酸等の金属キレート剤、グリセリン脂肪酸エステル、ショ糖脂肪酸エステル、レシチン等の乳化剤やシリコーン等の消泡剤も適宜任意に添加できる。

【0021】本発明の油脂組成物の用途は、フライ用、炒め用、生食用の何れにも使用できるが、特にフライ調理においてその効果が著しい。一般家庭における調理、弁当惣菜店等の中食産業、天ぷら店やとんかつ店等の外食産業、調理冷凍食品等の調理食品製造工場においてもその効果が発揮される。また、冷凍食品や油脂含有調味料等を喫食時に再加熱する際にもその効果が発揮される。

### 【0022】

【実施例】以下、実施例により本発明を具体的に説明する。尚、本発明はこれらの実施例に限定されるものではない。

におい評価は、油脂を600g磁性皿にとり、温度コントローラー付きの加熱機（理化学工業社製、「LABO X-115」）で180°Cまで加熱し、全体の強度並びに具体的なにおい特性として、刺激臭（ツンとしたにおい）、酸敗臭（劣化したにおい）、青臭さ、金属様のにおい、魚様のにおい、好ましい甘いにおいの6項目についてトレーニングを積んだパネル7名にて6段階で評価をおこない平均点を算出した。点数は以下の定義づけとした。

0点：無臭

1点：やっと感知できるにおい

2点：弱いにおい

3点：楽に感知できるにおい

4点：強いにおい

5点：強烈なにおい

【0024】下記組成物をサンプルとして用いた。

比較品1：レギュラーキャノーラ油（Regular Canola oil 以下、「R. C.」と略記する）

通常カナダ産菜種を搾油し、精製を施したもので、脂肪酸組成が下記に該当する油脂

オレイン酸 58.6%

リノール酸 22.2%

リノレン酸 9.9%

【0025】比較例2：低リノレン酸種キャノーラ油（Low Linolenic Canola oil 以下、「L. L. C.」と略記する）

低リノレン酸種カナダ産菜種を搾油し、精製を施したもので、脂肪酸組成が下記に該当する油脂

脂肪酸組成

脂肪酸組成 (重量%)	比較例1: R. C.	比較例2: L. L. C.	比較例3: H. O. L. L. C.	本発明品1	本発明品2
オレイン酸	58.6	66.2	76.4	55.0	47.9
リノール酸	22.2	22.4	13.7	33.1	39.6
リノレン酸	9.9	3.2	1.9	2.3	2.0
オレイン酸/リノール酸	2.64	2.96	5.58	1.66	1.21

【0030】

※※【表2】

官能評価

官能評価(n=7)	比較例1: R.C.	比較例2: L.L.C.	比較例3: H.O.L.L.C.	本発明品1	本発明品2
刺激臭 (ツンとしたにおい)	2.74	2.43	2.47	2.07	1.57
酸敗臭 (劣化したにおい)	1.50	0.67	0.67	0.66	0.71
青臭さ	1.00	0.57	0.41	0.00	0.00
金属様のにおい	0.14	0.00	0.00	0.00	0.00
魚様のにおい	0.71	0.29	0.29	0.00	0.00
好ましい甘いにおい	0.26	0.36	0.61	1.14	1.71
全体のにおい強度	4.14	3.29	3.50	3.07	2.64

【0031】上記結果より、比較例1と比較してリノレン酸含量の低い4品は共に、刺激臭、酸敗臭、青臭さ、金属様のにおい、魚様のにおい、全体のにおい強度が低減されることが明らかとなった。またオレイン酸/リノ

ール酸の比率が1.0～2.7の範囲である、本発明品1、本発明品2はともに比較例1、比較例2、比較例3と比較して、刺激臭、青臭さ、魚様のにおい、全体のにおい強度、等のにおいが弱く、好ましい甘いにおいが増加

することが示された。

【0032】実施例2

において評価は、油脂を600g磁性皿にとり、温度コントローラー付きの加熱機（理化学工業社製、「LABOX-115」）で180℃まで加熱し、刺激臭や不快臭の強さについてトレーニングを積んだパネル10名にて評価をおこなった。評価結果は以下の定義づけとした。

◎：弱いにおいて

\* ○：楽に感知できるにおいて

△：強いにおいて

×：強烈なにおいて

各種サンプルの脂肪酸組成、及び得られた評価結果は下表の通りであった。

【0033】

【表3】

	油脂・配合割合 <sup>1)</sup>	C18:1	C18:2	C18:3	C18:1/C18:2	評価
試料1	HLS100	14.0	75.6	0.1	0.2	×
試料2	CN100	30.1	55.7	1.0	0.5	△
試料3	LLC50/HLS50	38.8	50.9	1.7	0.8	○
試料4	LLC35/CN65	42.7	44.0	1.8	1.0	◎
試料5	LLC50/CN50	47.9	39.6	2.0	1.2	◎
試料6	LLC70/HLS30	49.5	39.7	2.3	1.2	◎
試料7	LLC70/HLSu30	52.1	36.2	2.5	1.4	◎
試料8	LLC80/HLS20	54.9	34.1	2.5	1.6	◎
試料9	LLC70/CN30	55.0	33.1	2.3	1.7	◎
試料10	LLC50/RBO50	55.0	29.4	2.0	1.9	◎
試料11	LLC80/CN20	58.5	29.9	2.5	2.0	◎
試料12	LLC90/HLS10	60.3	28.5	2.8	2.1	◎
試料13	LLC90/CN10	62.1	26.6	2.7	2.3	◎
試料14	LLC95/CN5	64.4	24.1	3.1	2.7	◎
試料15	LLC100	66.2	22.4	3.2	3.0	○
試料16	LLC70/HOS30	68.8	20.8	2.3	3.3	△
試料17	LLC50/HOS50	70.9	19.4	1.7	3.7	△
試料18	HOS100	77.3	16.5	0.1	5.0	×

\* 1：油脂の略称は以下の通り。数字は配合割合を表す。

H L S (High Linoleic Safflower oil)	高リノール酸種紅花油
C N (Corn oil)	コーン油
L L C (Low Linolenic Canola oil)	低リノレン酸種菜種油
H L S u (High Linoleic Sunflower oil)	高リノール酸種ひまわり油
R B O (Rice Bran oil)	米油
H O S (High Oleic Safflower oil)	高オレイン酸種紅花油

【0034】リノレン酸量が3.2%以下の実験系で、オレイン酸/リノール酸比と加熱時の刺激臭や不快臭の※

※強さの関係を調べると、オレイン酸/リノール酸比1.0～2.7の範囲で弱くなり、この比より高い範囲及び低い範囲ともに外れれば外れるほど強くなることが示され、オレイン酸/リノール酸比に最適な比があることが明らかとなった。

【0035】

【発明の効果】本発明によれば、油脂組成物を構成する全脂肪酸組成に含まれるリノレン酸の割合が1.0～4.0重量%、オレイン酸の割合が4.2～6.5重量%、リノール酸の割合が2.4～4.4重量%の範囲にある油脂組成物は、健康を維持するのにバランスがよく、フライ加熱調理する際に、油脂由来の刺激臭、不快臭を低減し、調理場の環境及び調理排気改善に寄与する。

フロントページの続き

(72)発明者 三宅 裕子

神奈川県横浜市鶴見区大黒町7番41号 味の素製油株式会社内

(72)発明者 田島 郁一

神奈川県横浜市鶴見区大黒町7番41号 味の素製油株式会社内

(72)発明者 松崎 成秀

神奈川県横浜市鶴見区大黒町7番41号 味の素製油株式会社内

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